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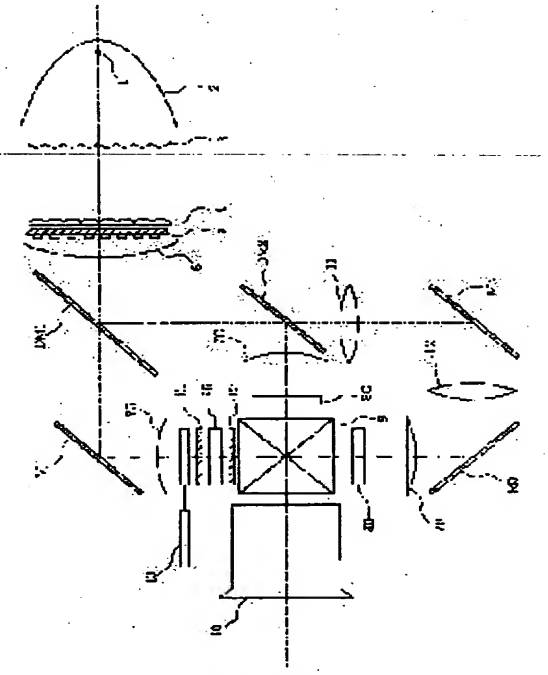
## (54) DISPLAY DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To solve the problem of a larger heat load imposed on a polarizing plate in a display in which the brightness is given precedence due to use of the wavelength region not used in a display in which the color reproducibility is given precedence when a single device is used to realize either of the displays with the precedence on the brightness and with the precedence on the color reproducibility.
SOLUTION: In the display device provided with a means to make the color purity of at least one color out of a plurality of colors variable, the polarizing plate placed on an optical path of light of which the color purity is varied with a means for making the color purity variable is provided with a heat transmitting transparent substrate with ≥2 W(m.K) thermal conductivity so as to reduce the heat load imposed on the polarizing plate.



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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]
[Claim 1] The display characterized by having at least one polarizing plate which has the transparence substrate with which said display consists of fluorite in the display which forms an image by modulating the light of two or more colors from which one or more display devices with the light from the light source are illuminated, and a color differs mutually by this display device.
[Claim 2] The display characterized by having the transparence substrate with which at least one display device in said one or more display devices consists of fluorite in the display which forms an image by modulating the light of two or more colors from which one or more display devices with the light from the light source are illuminated, and a color differs mutually by this display device.
[Claim 3] Said display is a display according to claim 1 or 2 characterized by having the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors.
[Claim 4] In the display which forms an image by modulating the light of two or more colors from which one or more display devices with the light from the light source are illuminated, and a color differs mutually by this display device this display It has the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors. The display characterized by having the polarizing plate equipped with the transparence substrate with which it is in the optical path of the light which can change color purity with the means which makes said color purity adjustable, and thermal conductivity contains the ingredient more than 2W/(m-K).
[Claim 5] In the display which forms an image by modulating the light of two or more colors from which one or more display devices with the light from the light source are illuminated, and a color differs mutually by this display device this display It has the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors. One display device in said one or more display devices The display characterized by being in the optical path of the light which can change color purity with the means which makes said color purity adjustable, and having the transparence substrate with which thermal conductivity contains the ingredient more than 2W/(m-K).
[Claim 6] The means which makes said color purity adjustable is the display of claim 3 thru/or 5 any 1 term publication characterized by the ability to adjust whether the light in a certain specific wavelength field reaches said display device.
[Claim 7] Said light source is a display according to claim 6 characterized by being the light source which has a peak in a certain wavelength in said a certain specific wavelength field.
[Claim 8] The display according to claim 7 characterized by said a certain wavelength being 570nm or more 600nm or less.
[Claim 9] Said light source is a display according to claim 8 which is a high-pressure mercury lamp and is characterized by said a certain wavelength being about 580nm.
[Claim 10] The means which makes said color purity adjustable is a display claim 3 characterized by having a means to take an optical element to the optical path of the light which can change said color purity, or to change the posture of the optical element in the optical path of the light which can change said color purity thru/or given in 9 any 1 terms.
[Claim 11] The means which makes said color purity adjustable is a display according to claim 10 characterized by taking a dichroic mirror in and out to the optical path of the light which can change said color purity, and making color purity adjustable.
[Claim 12] Said transparence substrate is a display claim 4 characterized by for thermal conductivity forming the thin film or sheet metal which consists of the ingredient more than 2W/(m-K), and changing on a certain transparence substrate thru/or given in 11 any 1 terms.

[Claim 13] Said transparence substrate is a display claim 4 characterized by thermal conductivity containing the ingredient more than 5W/(m-K) thru/or given in 12 any 1 terms.
[Claim 14] Said transparence substrate is a display claim 4 characterized by including fluorite, sapphire, and at least one or more ingredients in a diamond thru/or given in 13 any 1 terms.
[Claim 15] Claim 4 characterized by forming said transparence substrate from fluorite, sapphire, or a diamond thru/or a display given in 14 any 1 terms.
[Claim 16] Claim 1 characterized by having two or more dichroic mirrors which divide the white light from the light source into said light of two or more colors from which a color differs mutually thru/or a display given in 15 any 1 terms.
[Claim 17] a display claim 1 characterized by having two or more dichroic mirrors for compounding the image light from two or more display devices which said light of two or more colors from which a color differs mutually is alike, respectively, and are arranged by corresponding, and said two or more display devices which modulate the light of two or more of said colors thru/or given in 16 any 1 terms.
[Claim 18] Claim 1 characterized by having a dichroic prism for compounding the image light from two or more display devices arranged corresponding to said each of the light of two or more colors from which a color differs mutually, and said two or more display devices which modulate the light of two or more of these colors thru/or a display given in 17 any 1 terms.
[Claim 19] Said dichroic prism is a display according to claim 18 characterized by being constituted so that four prism may be stuck with adhesives, respectively and a wavelength selection reflecting layer may intersect perpendicularly substantially.
[Claim 20] The projection device characterized by having a projection system for carrying out expansion projection of the image formed in claim 1 thru/or 19 any 1 terms with the display and this display of a publication.
[Claim 21] The display device characterized by having the mechanical component formed on the transparence substrate which consists of fluorite, and said transparence substrate.
[Claim 22] The transparence substrate which is a polarizing plate to which outgoing radiation of the polarization direction of incident light is arranged and carried out, and consists of fluorite, and the polarizing plate characterized by having the polarization film formed on said transparence substrate.

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[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the indicating equipment which solved the problem of the thermal load of the polarizing plate arranged a liquid crystal panel and before and behind that, and a projection device in the liquid crystal projector used for indicating an indicating equipment, for example, a computer image, and the video image by the big screen.
[0002]
[Description of the Prior Art] In recent years, the projection mold display which raised brightness is called for. The configuration of the conventional projection mold display is shown in drawing 15 . In this drawing, after the white light injected from the light source section 1 passes the fly eye lenses 3 and 4, the PS sensing element 5, and condenser-lens 6 grade, the light of a red band penetrates with a dichroic mirror DM 1, and since green, blue band light is reflected. Generally, as the light source, a halogen lamp, a metal halide lamp, an extra-high pressure mercury lamp, etc. are used, and a dichroic mirror, a dichroic prism, etc. are used as color separation and a synthetic optical element.
[0003] The red band light which penetrated the dichroic mirror DM 1 in which the spectral transmittance shown in drawing 16 (a) is shown changes an optical path 90 degrees, it carries out incidence to liquid crystal display component 8R through the trimming filter TR in which the spectral transmittance shown in field lens 7R and drawing 16 (c) is shown, and light modulation is carried out by the total reflection mirror M1 here according to an input signal. Incidence of the light by which light modulation was carried out is carried out to a dichroic prism 9, and it changes an optical path 90 degrees with a dichroic prism 9, and it carries out incidence to a projector lens 10.
[0004] On the other hand, it is reflected by the dichroic mirror DM 1 and incidence of the green blue band light which changed the optical path 90 degrees is carried out to the dichroic mirror DM 2 in which the spectral transmittance shown in drawing 16 (b) is shown. From drawing 16 (b), since the dichroic mirror DM 2 has the property of reflecting green band light, it is reflected, and green band light changes the optical path 90 degrees, it carries out incidence to liquid crystal display component 8G through the trimming filter TG in which the spectral transmittance shown in field lens 7G and drawing 16 (d) is shown, and light modulation is carried out here according to an input signal. Incidence of the green band light by which light modulation was carried out is carried out to the order of a dichroic prism 9 and a projector lens 10.
[0005] Through a condenser lens 11, a relay lens 12, total reflection mirrors M2 and M3, and field lens 7B, incidence of the blue band light which penetrated the dichroic mirror DM 2 is carried out to liquid crystal display component 8B, and light modulation is carried out here according to an input signal. Incidence of the blue band light by which light modulation was carried out is carried out to a dichroic prism 9, and it changes an optical path 90 degrees with a dichroic prism 9, and it carries out incidence to a projector lens 10.
[0006] Thus, in the constituted conventional projection mold display, the polarizing plate required before and after the liquid crystal display component 8 was stuck on clear glass, such as cover glass currently used for the liquid crystal display component 8, the field lens 7, and a dichroic prism 9.
[0007]
[Problem(s) to be Solved by the Invention] The numerical aperture of a liquid crystal display component is low, and when the quantity of light of the lamp to be used is small, a clear glass base (thermal conductivity about 1W/(m-K)) is also enough like the above-mentioned conventional technique. on the other hand -- a these days and 1.3 mold liquid crystal display component -- the number of pixels -- by

raising almost at least 770,000 the things of 60% of numerical apertures and the power consumption of a lamp, the brightness on a screen is improving and the miniaturization of a liquid crystal display component is also progressing.
[0008] However, for the reason, the thermal load concerning a polarizing plate required for a liquid crystal display component becomes large, and another problem of the performance degradation of a polarizing plate will arise.
[0009] it -- in addition, when one equipment realizes the display which gave priority to the display or the color-reproduction nature which gave priority to brightness which is indicated by JP,07-072450,A, in order to use the wavelength field (from about 570nm to 600nm) which was not being used in the case of the display which gave priority to color-reproduction nature in the case of the display which gave priority to brightness, a bigger thermal burden will be placed on a polarizing plate.
[0010] What is necessary is just to use the sapphire (42W/(m-K)) which has a glass substrate about 40 times the thermal conductivity of transparence as a substrate of a polarizing plate as indicated by JP,11-231277,A, in order to solve the thermal burden placed on this polarizing plate. However, when it is going to solve the problem of a thermal burden using sapphire simply, in a projection mold display which realizes the display which gave priority to the display or color reproduction nature which gave priority to the brightness of the projection mold display of 3 plate methods like drawing 15 , or JP,07-231277,A with one equipment, the silicon on sapphire of a total of six sheets will be needed, and it will lead to a big cost rise.
[0011] Moreover, if it is going to raise cooling effectiveness with a cooling fan, problems, like the power consumption of a cooling fan increases will arise. When one equipment realizes the display which gave priority to the display or color reproduction nature which gave priority to brightness which is especially indicated by JP,07-072450,A, it had to set up in consideration of the time of the display which gave priority to the brightness whose quantity of light increases, and will have cooled vainly in the case of the display which gave priority to color reproduction nature, and cooling is not desirable.
[0012] Moreover, although the method of changing the power consumption of a cooling fan in the time of the display which gave priority to the display or color reproduction nature which gave priority to brightness is also considered, the system which changes power consumption will have to be incorporated and it will lead to a cost rise or increase of a tooth space.
[0013] Then, this invention aims at offering the display which becomes possible [ attaining mitigation-ization of cost ] by having the means which makes adjustable color purity of the light of at least one color in two or more colors, and being able to mitigate the thermal load to a polarizing plate on the occasion of changing the color purity of the light of said at least one color, and low-electrifying a cooling fan.
[0014]
[Means for Solving the Problem] (1) A display according to claim 1 illuminates one or more display devices with the light from the light source, and is characterized by having at least one polarizing plate which has the transparence substrate with which said display consists of fluorite in the display which forms an image by modulating the light of two or more colors from which a color differs mutually by this display device.
[0015] (2) A display according to claim 2 illuminates one or more display devices with the light from the light source, and is characterized by having the transparence substrate with which at least one display device in said one or more display devices consists of fluorite in the display which forms an image by modulating the light of two or more colors from which a color differs mutually by this display device.
[0016] (3) According to claim 1 or 2, as for the display according to claim 3, said display is characterized by having the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors.
[0017] (4) In the display which forms an image by modulating the light of two or more colors from which a display according to claim 4 illuminates one or more display devices with the light from the light source, and a color differs mutually by this display device This display has the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors. It is in the optical path of the light which can change color purity with the means which makes said color purity adjustable, and is characterized by having the polarizing plate equipped with the transparence substrate with which thermal conductivity contains the ingredient more than 2W/(m-K).
[0018] (5) In the display which forms an image by modulating the light of two or more colors from which a display according to claim 5 illuminates one or more display devices with the light from the light source, and a color differs mutually by this display device This display has the means which makes adjustable color purity of the light of at least one color in the light of two or more of said colors. One

display device in said one or more display devices It is characterized by being in the optical path of the light which can change color purity with the means which makes said color purity adjustable, and having the transparence substrate with which thermal conductivity contains the ingredient more than 2W/(m-K).
[0019] (6) A means by which a display according to claim 6 makes said color purity adjustable according to claim 3 thru/or 5 any 1 terms is characterized by the ability to adjust whether the light in a certain specific wavelength field reaches said display device.
[0020] (7) The display according to claim 7 is characterized by being the light source in which said light source has a peak in a certain wavelength in said a certain specific wavelength field according to claim 6.
[0021] (8) It is characterized by a display according to claim 8 being 570nm or more 600nm or less according to claim 7 for said a certain wavelength.
[0022] (9) Said light source of a display according to claim 9 is a high-pressure mercury lamp, and it is characterized by said a certain wavelength being about 580nm.
[0023] (10) A means by which a display according to claim 10 makes said color purity adjustable according to claim 3 thru/or 9 any 1 terms is characterized by having a means to take an optical element to the optical path of the light which can change said color purity, or to change the posture of the optical element in the optical path of the light which can change said color purity.
[0024] (11) It is characterized by for a means by which the display of a publication makes said color purity adjustable according to claim 10 taking a dichroic mirror in and out of claim 100,000,011 to the optical path of the light which can change said color purity, and making color purity adjustable.
[0025] (12) The display according to claim 12 is characterized by for said transparence substrate forming the thin film or sheet metal with which thermal conductivity consists of the ingredient more than 2W/(m-K) on a certain transparence substrate, and changing according to claim 4 thru/or 11 any 1 terms.
[0026] (13) The display according to claim 13 is characterized by thermal conductivity containing the ingredient more than 5W/(m-K), as for said transparence substrate according to claim 4 thru/or 12 any 1 terms.
[0027] (14) The display according to claim 14 is characterized by said transparence substrate containing fluorite, sapphire, and at least one or more ingredients in a diamond according to claim 4 thru/or 13 any 1 terms.
[0028] (15) The display according to claim 15 is characterized by forming said transparence substrate from fluorite, sapphire, or a diamond according to claim 4 thru/or 14 any 1 terms.
[0029] (16) The display according to claim 16 is characterized by having two or more dichroic mirrors which divide the white light from the light source into said light of two or more colors from which a color differs mutually according to claim 1 thru/or 15 any 1 terms.
[0030] (17) The display according to claim 17 is characterized by having two or more dichroic mirrors for compounding the image light from two or more display devices arranged corresponding to said each of the light of two or more colors from which a color differs mutually, and said two or more display devices which modulate the light of two or more of said colors according to claim 1 thru/or 16 any 1 terms.
[0031] (18) The display according to claim 18 is characterized by having a dichroic prism for compounding the image light from two or more display devices arranged corresponding to said each of the light of two or more colors from which a color differs mutually, and said two or more display devices which modulate the light of two or more of these colors according to claim 1 thru/or 17 any 1 terms.
[0032] (19) The display according to claim 19 is characterized by constituting said dichroic prism so that four prism may be stuck with adhesives, respectively and a wavelength selection reflecting layer may intersect perpendicularly substantially according to claim 18.
[0033] (20) The projection device according to claim 20 is characterized by having a projection system for carrying out expansion projection of the image formed with the display and this display of a publication according to claim 1 thru/or 19 any 1 terms.
[0034] (21) The display device according to claim 21 is characterized by having the mechanical component formed on the transparence substrate which consists of fluorite, and said transparence substrate.
[0035] (22) A polarizing plate according to claim 22 is a polarizing plate to which outgoing radiation of the polarization direction of incident light is arranged and carried out, and is characterized by having the polarization film formed on the transparence substrate which consists of fluorite, and said transparence substrate.
[0036]
[Embodiment of the Invention] Next, an example is explained to a detail, drawing being shown in condition. The field more than a certain wavelength is penetrated, in this example, or it prevents the field

not more than it, it has an optical element with the reverse property in an optical path, and implementation of both the display which gave priority to brightness, and the display which gave priority to color reproduction nature is enabled with one projection device with constituting so that it may have the device which inserts [ optical element / this ].

[0037] about [ than the clear glass (thermal conductivity: 1W/(m-K)) well used as a display device or a substrate of a polarizing plate / with larger thermal conductivity / moreover, ] -- about [ the sapphire which has the thermal conductivity of 42W/(m-K), and ] -- it becomes possible to ease the polarizing plate in the time of the display which gave priority to brightness, and the thermal burden of a display device by creating a display device and the substrate of a polarizing plate with the fluorite which has the thermal conductivity of 10W/(m-K). In addition, cost can reduce the number of sheets of a high heat transfer transparence substrate by using for other optical paths the display device which consists of clear glass, and a polarizing plate using the display device and polarizing plate with which thermal conductivity consists of a high (thermal conductivity 2W / (m-K) above) heat transfer transparence substrate as compared with the above clear glass as the display device of the optical path which inserted [ optical element ], or a substrate of the polarizing plate before and behind that, and it becomes possible to aim at mitigation of cost. In addition, as an ingredient used as a display device or a substrate of a polarizing plate, if the heat transfer transparence substrate more than 5W/(m-K) with clearly high thermal conductivity is used rather than thermal conductivity 1W/(m-K) of clear glass, still better effectiveness will be acquired.

[0038] Here, in no examples, although sapphire with high thermal conductivity is used for the substrate of the polarizing plate which a thermal load requires, fluorite may be used instead of the sapphire instead of the limitation, in addition even if it uses another ingredient with high thermal conductivity, it cares about. Moreover, the above-mentioned sapphire etc. may be used for the substrate of a display device instead of the substrate of a polarizing plate. Moreover, in addition to this, you may use for the large member of a thermal load.

[0039] The detailed configuration of the projection mold display by the example 1 of this invention is shown in [example 1] drawing 1 . Moreover, the spectral transmittance of the optical element 13 used for drawing 2 at this example is shown, and the spectral transmittance of the dichroic mirror 1 and DMs 2 under the above-mentioned configuration is shown in drawing 3 . These spectral transmittance is the examples of a design at the time of using a certain extra-high pressure mercury lamp. However, it does not pass over these numeric values to an example to the last, and they are not limited to these values. Various values can be set up according to the class of light source. In drawing 1 , the white light injected from the light source section 1 of an extra-high pressure mercury lamp It is reflected by the reflector 2 and the fly eye lenses 3 and 4 are passed. By the PS sensing element 5, by 1/2 wavelength plate into which the mirror divided into P polarization and S polarization and the polarization direction are changed, double the polarization direction and outgoing radiation is carried out. After passing condenser-lens 6 grade, the light of a red band penetrates with a dichroic mirror DM 1. Since green, blue band light is divided into the light of a red band, a green band, and a blue band, when it is reflected, and the light of a blue band penetrates and the light of a green band reflects with a dichroic mirror DM 2. And the light of each color carries out incidence to the liquid crystal displays 8R, 8G, and 8B corresponding to each color, an image is formed, each color is compounded with a dichroic prism 9, and it is projected by the plane of incidence-ed with a projector lens 10.

[0040] By the total reflection mirror M1, the red band light which penetrated the dichroic mirror DM 1 in which the spectral transmittance shown in drawing 3 (a) is shown changes an optical path 90 degrees, and penetrates field lens 7R. When the optical element 13 is inserted into the optical path, it penetrates an optical element 13, and it carries out incidence to the sapphire polarizing plate R1 and liquid crystal display component 8R, and light modulation is carried out here according to an input signal.

[0041] Incidence of the light by which light modulation was carried out is carried out to the order of sapphire polarizing plate 2R and a dichroic prism 9, and it changes an optical path 90 degrees with a dichroic prism 9, and it carries out incidence to a projector lens 10. when an optical element 13 does not exist in an optical path, an optical element 13 is not minded but carries out incidence to liquid crystal display component 8R, according to an input signal, it comes out and light modulation is carried out here. Incidence of the light by which light modulation was carried out is carried out to a dichroic prism 9, and it changes an optical path 90 degrees with a dichroic prism 9, and it carries out incidence to a projector lens 10. The dichroic prism 9 here is constituted so that four prism may be stuck with adhesives, respectively and a wavelength selection reflecting layer may become abbreviation cross joint-like.

[0042] On the other hand, it is reflected by the dichroic mirror DM 1 and incidence of the green - blue

band light which changed the optical path 90 degrees is carried out to the dichroic mirror DM 2 in which the spectral transmittance shown in drawing 3 (b) is shown. From drawing 3 (b), since the dichroic mirror DM 2 has the property of reflecting the green band light G, it is reflected, and green band light changes the optical path 90 degrees, it carries out incidence to liquid crystal display component 8G through field lens 7G, and light modulation is carried out here according to an input signal. Incidence of the green band light by which light modulation was carried out is carried out to the order of a dichroic prism 9 and a projector lens 10.

[0043] Through a condenser lens 11, a relay lens 12, total reflection mirrors M2 and M3, or field lens 7B, incidence of the blue band light which penetrated the dichroic mirror DM 2 is carried out to liquid crystal display component 8B, and light modulation is carried out here according to an input signal. Incidence of the blue band light by which light modulation was carried out is carried out to a dichroic prism 9, and it changes an optical path 90 degrees with a dichroic prism 9, and it carries out incidence to a projector lens 10.

[0044] Here, when the optical element 13 is not inserted into the exposure optical path, although it is lower than required color purity in a natural drawing display etc., the color purity determined with the cut wavelength of DM1 and DM2 serves as a bright display, for example, is set as sufficient color purity for the presentation in a firm or a school. When the optical element 13 is not inserted into the exposure optical path, about 570-600nm band light is also used as incident light.

[0045] On the contrary, when quality high displays of color purity, such as a natural drawing display, are required, an optical element 13 is inserted into an exposure optical path. If an optical element 13 is inserted into an exposure optical path, about 570-600nm band light will no longer be injected to a liquid crystal display component side, about 510-570nm light will be used as a green band display light, and incident light about 600nm or more will be used as a red band display light.

[0046] The spectral characteristics at the time of insertion of an optical element 13 and un-inserting are shown in drawing 4.. An optical element 13 can be inserted into an exposure optical path, and color purity can be raised by not using 570nm - 600nm light. However, if the light in which color purity is generally reduced is intercepted, although color purity will improve, the quantity of light will fall. In the case of the above-mentioned optical element 13, a cut band and permeability are set up so that color purity and color balance can be secured without reducing the quantity of light sharply.

[0047] Moreover, it is only a red wavelength field that in a configuration like drawing 1 the quantity of light changes as shown in drawing 4 . Therefore, it leads also to the fall of cost by being able to ease the thermal load of the polarizing plate of each wavelength field because the red wavelength field where specific gravity is set to blue and a green wavelength field, and the quantity of light changes cooling according [ the substrate of the polarizing plate of blue and a green wavelength field ] to a cooling fan etc. using clear glass uses the substrate of a polarizing plate as sapphire, and reducing the number of sheets of silicon on sapphire. Moreover, a fan's low electrification and miniaturization are attained and the problem of the noise is also eased [ be / what is necessary / just in blue and a green wavelength field without the quantity of light change by cooling by the cooling fan for specific gravity ].

[0048] In addition, in drawing 1 , from DM1, an optical element 13 may also be set anywhere just before the liquid crystal display component of a red wavelength optical path, as long as it is between the liquid crystal display components of a red wavelength optical path. Although the optical element is moved to right and left, you may move by drawing 1 up and down like drawing 5 , and you may make it insert out of an optical path by carrying out the circular motion centering on a certain point like drawing 6 . Moreover, the direction of an optical element 13 of operation is not limited to these. Moreover, actuation of using being based on a short wavelength side if the cut wavelength of not only insertion and detachment but a dichroic mirror enlarges whenever [ incident angle / of light ], and giving an include angle for an optical element 13 to an optical axis is sufficient.

[0049] Moreover, the part light wave length property of DM1 is not limited to these, and may use two or more optical elements according to this property.

[0050] Moreover, although two silicon on sapphire is used as a substrate of a polarizing plate in drawing 1 , it is not limited to this number of sheets, and an ingredient with other still higher thermal conductivity, such as not only sapphire but fluorite, may be used.

[0051] The detailed configuration of the projection mold display by the example 2 of this invention is shown in [example 2] drawing 7 . Here, the optical element 13 which had the wavelength spectral characteristic of drawing 8 (c) just before the liquid crystal display component of a green wavelength optical path can be installed by changing drawing 8 (a) and the wavelength spectral characteristic of DM2 for the wavelength spectral characteristic of DM1 like drawing 8 (b). As long as this installation location

is also between the liquid crystal display components of DM1 to a green wavelength optical path, you may set anywhere.
[0052] The spectral characteristics at the time of insertion of an optical element 13 and un-inserting are shown in drawing 9 . An optical element 13 can be inserted into an exposure optical path, and color purity can be raised by not using 570nm - 600nm light. However, if the light in which color purity is generally reduced is intercepted, although color purity will improve, the quantity of light will fall. In the case of the above-mentioned optical element 13, a cut band and permeability are set up so that color purity and color balance can be secured without reducing the quantity of light sharply.
[0053] Moreover, it is only a green wavelength field that in a configuration like drawing 7 the quantity of light changes as shown in drawing 9 . Therefore, it leads also to the fall of cost by being able to ease the thermal load of the polarizing plate of each wavelength field because the green wavelength field where specific gravity is set to blue and a red wavelength field, and the quantity of light changes cooling according [ the substrate of the polarizing plate of blue and a red wavelength field ] to a cooling fan etc. using clear glass uses the substrate of a polarizing plate as sapphire, and reducing the number of sheets of silicon on sapphire.
[0054] Moreover, a fan's low electrification and miniaturization are attained and the problem of the noise is also eased [ be / what is necessary / just in blue and a red wavelength field without the quantity of light change by cooling by the cooling fan for specific gravity ]. The part light wave length property of DM1 is not limited to these, and may use two or more optical elements according to this property.
[0055] Although two silicon on sapphire is used as a substrate of a polarizing plate in drawing 7 , it is not limited to this number of sheets, and an ingredient with other still higher thermal conductivity, such as not only sapphire but fluorite, may be used.
[0056] The detailed configuration of the projection mold display by the example 3 of this invention is shown in [example 3] drawing 10 . Although the example which used two or more liquid crystal display components has so far been given in the examples 1 and 2, it is not limited to this and the color display in one sheet is also possible. This is explained as an example 3 of this invention below. The spectral transmittance of the dichroic mirrors 4-DMs 7 in the thing of the above-mentioned configuration is shown in drawing 11 . Drawing 12 and drawing 13 show the internal configuration and optical-path Fig. of the outline of the optical path of this example, and the liquid crystal display component 8, respectively.
[0057] The dichroic mirrors DM4-DM6 in which the spectral reflectance shown in drawing 11 is shown divide into blue, green, and red band light, and the micro-lens array 14 in which these blue, green, and red band light were prepared at the light source side of the liquid crystal display component 8 is irradiated by incident angle different, respectively. The liquid crystal layer 16 of the above-mentioned liquid crystal display component 8 has separated to the pixel corresponding to blue, green, and red band light, as shown in drawing 14 , and it is driven independently, respectively. And after blue, green, and red band light pass a micro lens 14, the distribution exposure of them is carried out for every color at the pixel to which the above corresponds.
[0058] One equipment has realized the display which gave priority to the display which gave priority to color reproduction nature by replacing DM6 which had the spectral characteristic of drawing 11 (c) in the optical path, and DM7 with the spectral characteristic of drawing 11 (d), or brightness. When the display and DM7 which gave priority to color reproduction nature without 570nm - 600nm light when DM6 was in an optical path are in an optical path, it becomes the display which gave priority to brightness using 570nm - 600nm light.
[0059] By using silicon on sapphire as a substrate of a polarizing plate required before and after a liquid crystal display component, the thermal load to the polarizing plate in the case of the display which gave priority to brightness is also mitigated, and it leads also to low electrification of a cooling fan. In addition, a general metal mirror is sufficient as DM7, without limiting to a dichroic mirror.
[0060] Thus, the device it is made [ device ] to insert [ device ] in an optical element exposure optical path can be established, and two kinds of display quality can be realized. In addition, it is also possible to also perform insertion and detachment of an optical element manually and to constitute combining the gray goods from power and a power transfer machine. In addition to it, the thermal load of a polarizing plate is also eased by using sapphire as a substrate of a polarizing plate.
[0061] Although two silicon on sapphire is used as a substrate of a polarizing plate in drawing 10 , it is not limited to this number of sheets, and an ingredient with other still higher thermal conductivity, such as not only sapphire but fluorite, a diamond, etc., may be used.
[0062] As mentioned above, although the example has been explained, and sapphire and fluorite have been mentioned as an ingredient with high thermal conductivity, not only these but a diamond etc. may be

used. Moreover, it is not considering an ingredient with high thermal conductivity as a substrate of a polarizing plate, and you may stick and use for a display device like drawing 17 , and may use for the both. In addition, you may use for the member which requires a thermal load alternatively.
[0063] Moreover, the substrate of a polarizing plate and the substrate of a display device may consist of two or more kinds of ingredients. In that case, the plates which consist of two or more kinds of ingredients may be stuck, the thin film of another ingredient may be formed on the plate which consists of a certain ingredient, and after mixing an ingredient, a substrate may be formed. However, in order to attain the purpose of this invention of mitigating a thermal load, as for at least one of two or more kinds of the ingredients, it is desirable for thermal conductivity to carry out to more than 2W/(m-K).
[0064]
[Effect of the Invention] As explained above, according to this invention, by taking an optical element or changing the posture of an optical element to the optical path of the color of at least one light in two or more colors While being able to reduce the number of configuration members required in order to face changing the purity of the color of at least one light, and to be able to mitigate the thermal load to a display device and a polarizing plate and to mitigate the thermal load to this display device and a polarizing plate By low-electrifying a cooling fan, it becomes possible to attain mitigation-ization of cost.

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[Translation done.]

* NOTICES *

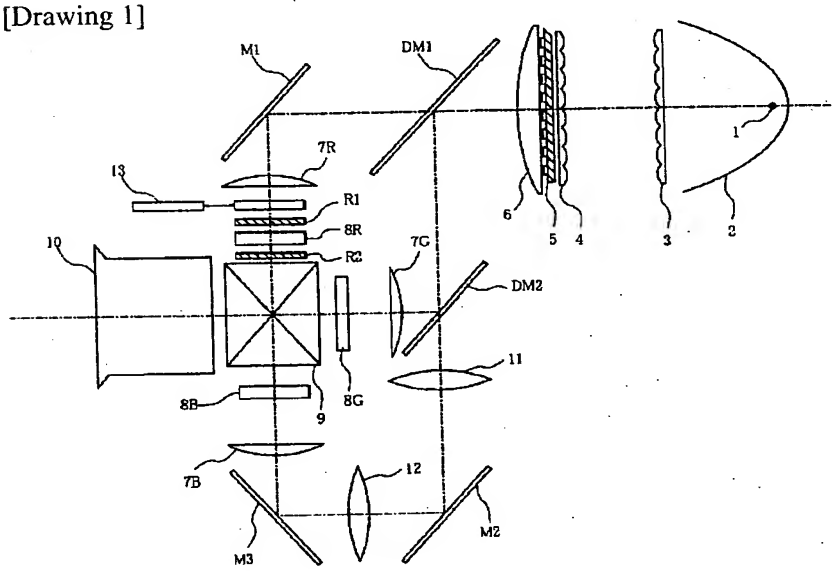


1.This document has been translated by computer. So the translation may not reflect the original precisely.

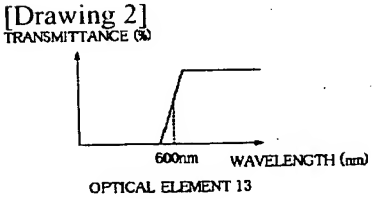
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

## DRAWINGS

[Drawing 1]



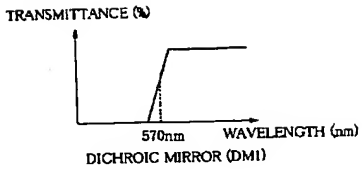

[Drawing 2]



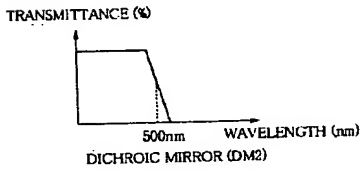

OPTICAL ELEMENT 13

[Drawing 3]

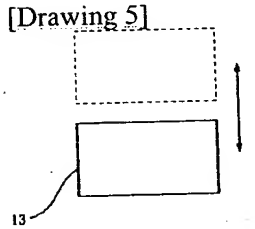
A




B




[Drawing 5]

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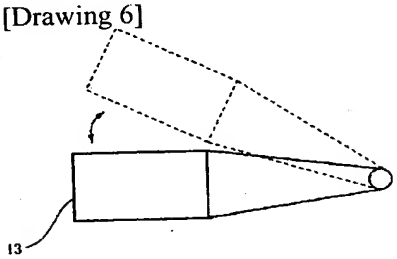
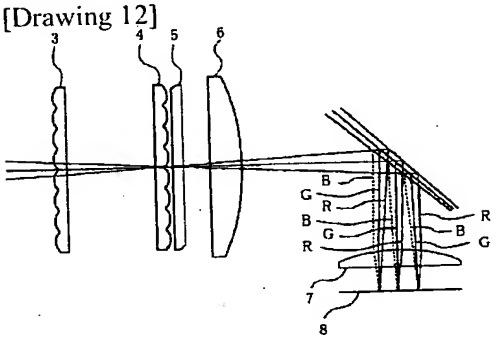
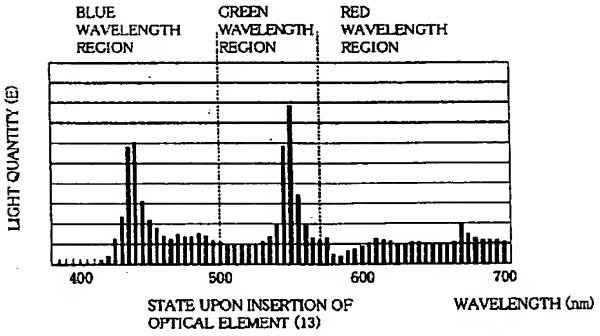



[Drawing 12]




[Drawing 4]

A

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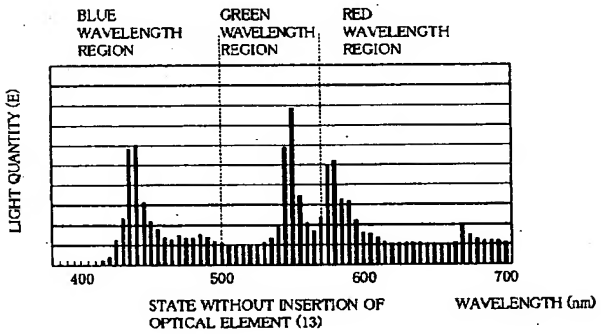


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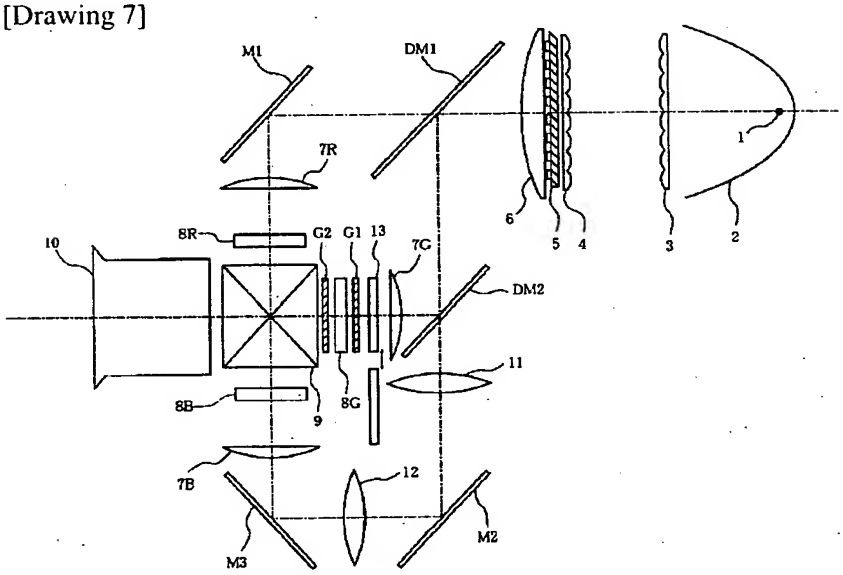
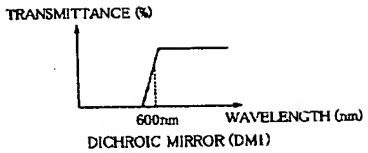


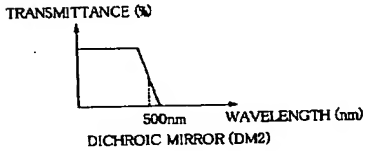

[Drawing 8]

A



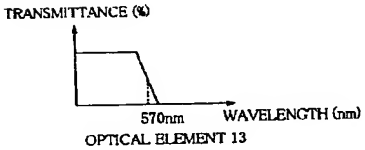

DICHROIC MIRROR (DM1)

B



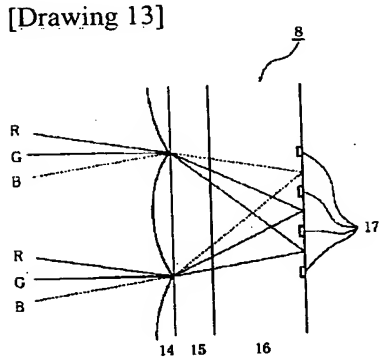

DICHROIC MIRROR (DM2)

C




OPTICAL ELEMENT 13

[Drawing 13]

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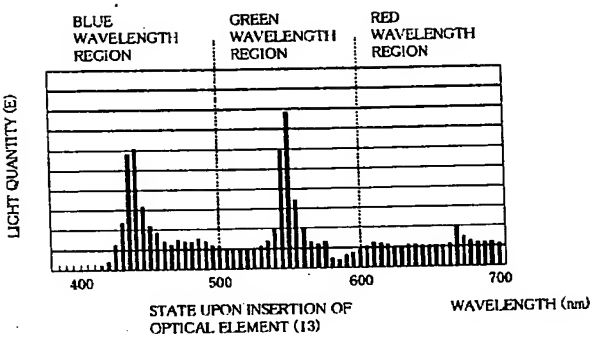
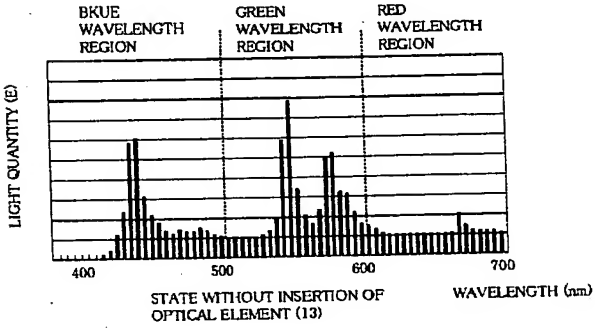
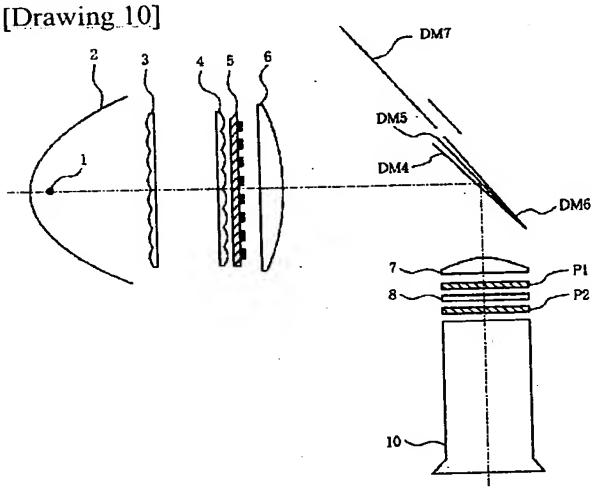
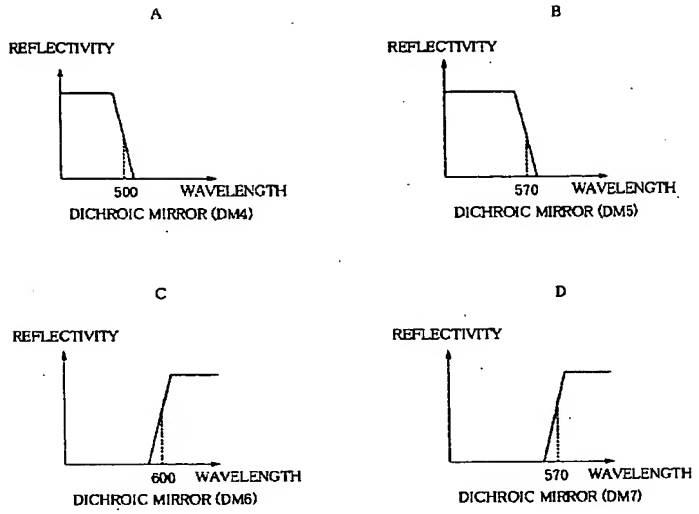


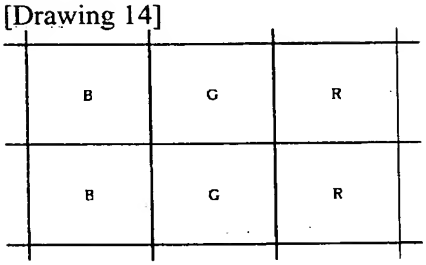

[Drawing 10]



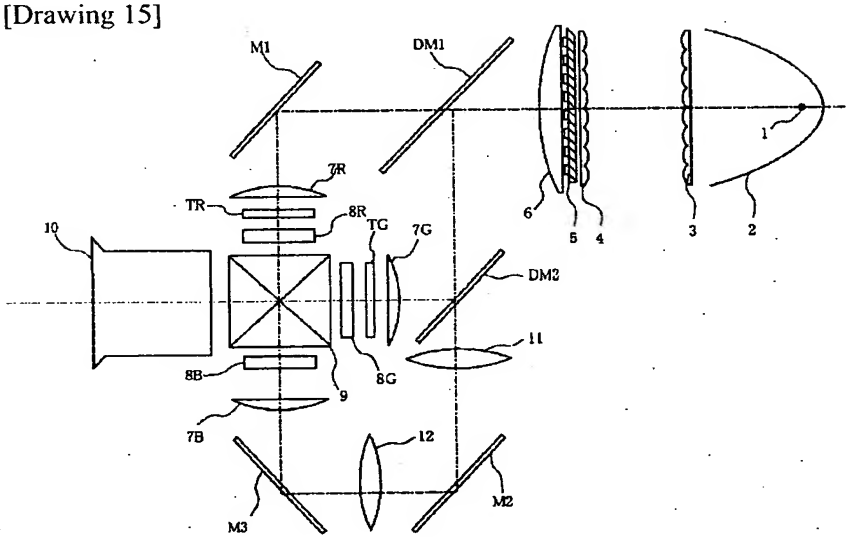

[Drawing 11]



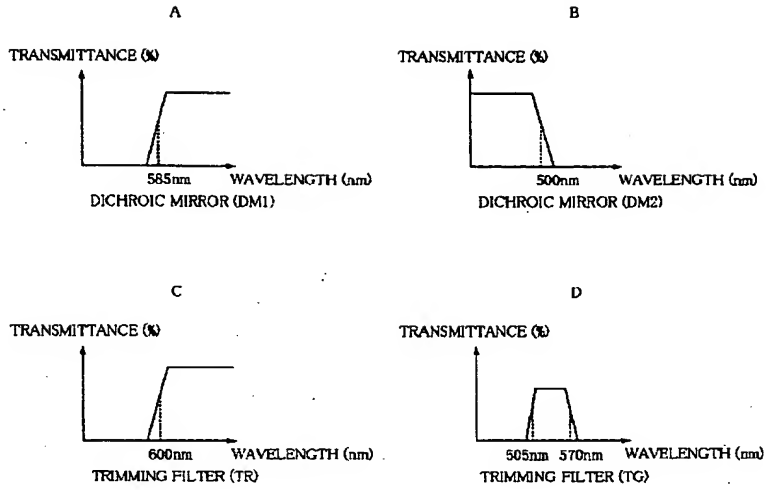

[Drawing 14]



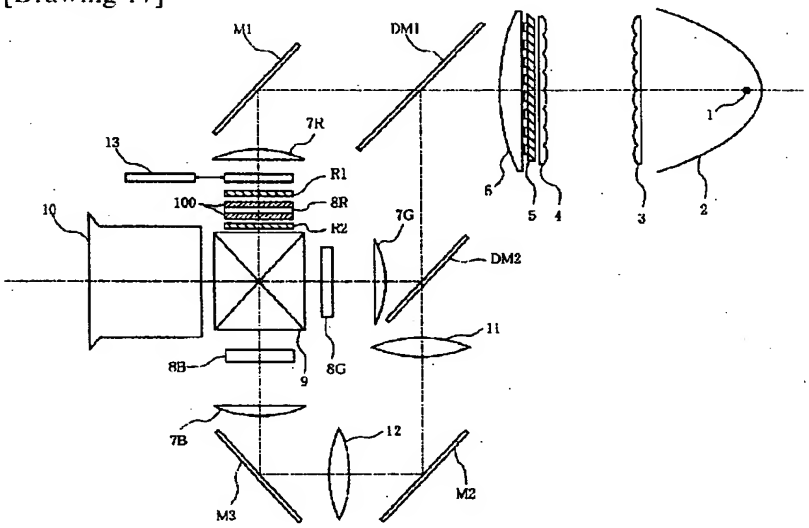

[Drawing 15]




[Drawing 16]




[Drawing 17]

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[Translation done.]